

Abstract of the Disclosure

A diaphragm valve includes a pressure vent communicating with an enclosed space behind the diaphragm for reducing resistance to transitioning of the diaphragm between the open and closed positions. In some implementations, a pump or other source of suction is coupled to the pressure vent to reduce fluid pressure in the enclosed space. When used in an atomic layer deposition (ALD) system, the venting and suction improves the thin film deposition process and prevents leakage through the valve of potentially toxic ALD precursor vapors. Features for thermal management and reliability enhancement are also described.